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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,260	11/26/2003	Toyokazu Sakata	TAI 145	6433
23995	7590	05/25/2006	EXAMINER	
RABIN & Berdo, PC 1101 14TH STREET, NW SUITE 500 WASHINGTON, DC 20005			VINH, LAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/721,260

**Applicant(s)**

SAKATA, TOYOKAZU

**Examiner**

Lan Vinh

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-15 is/are pending in the application.
- 4a) ☐ Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/3/2006 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Jiang et al (US 2003/0181034 A1)

Regarding claim 13, Jiang discloses a method for forming vias and trenches. The method comprises the steps of:

forming a conductive feature 306/first interconnection (page 7, paragraph 0067)

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forming an interlayer low k dielectric layer 310 (SOG) on the feature 306 (page 7, paragraph 0067)

forming a via/contact hole for electrically connecting the conductive feature 306 and second metal (Cu), in the low-k dielectric layer 310 (page 7, paragraph 0069, figs. 18, 21)

forming a trench/groove for embedding the second metal (Cu) in the layer 310/low-k interlayer dielectric layer (page 7, paragraph 0068, fig. 19)

wherein, in the step of forming via and trench, plasma etching is conducted using a gas mixture including fluorocarbon, oxygen and argon gas under a pressure of 40-60 mTorr and a RF power of 500 Watts ( page 5, paragraph 0053, paragraph 0055; figs 8-9)

wherein an etch stop layer 308 is formed under the low-k layer 310/is not formed in the low-k interlayer insulating (page 7, paragraph 0067; fig. 19)

Regarding claim 11, Jiang discloses using C<sub>4</sub>F<sub>8</sub> in the plasma gas mixture (page 5, paragraph 0055)

The limitation of claim.12 has been discussed above

Regarding claim 14, Jiang discloses the ratio of oxygen to a combined fluorocarbon gas and oxygen gas is : 20 sccm of fluorocarbon + 20 sccm of oxygen (20 sccm of oxygen/40 sccm of fluorocarbons + oxygen/ 50 % of oxygen in the mixture)

Regarding claim 15, Jiang discloses that in the step of forming via and trenches, plasma etching the contact hole and trench using a gas mixture including fluorocarbon,

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oxygen and argon gas under a pressure of 40-60 mTorr and a RF power of 500 Watts (page5, paragraph 0053, paragraph 0055; figs 8-9)

### ***Response to Arguments***

4. Applicant's arguments with respect to the previously cited reference of Tsai (US 2003/0008511 A1) have been considered but are moot in view of the new ground(s) of rejection.

The applicants argue that Tsai does not disclose "forming an interconnection groove for embedding the second interconnection in the interlayer insulating film comprising the low-k film" as required by claim 13. This argument is moot in view of newly cited reference of Jiang et al (US 2003/0181034 A1) because Jiang discloses a step of forming a trench/groove for embedding the second metal (Cu), the trench is formed in the layer 310/low-k interlayer dielectric layer (page 7, paragraph 0068, fig. 19)

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471.

The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'V. Lee' or similar, written in a cursive style.

LV

May 22, 2006